Docket No.: P/70038/Alstom

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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October 23, 2001
(date)
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Reg. No. 27,564

In re: Application of : Donald Colin Murray OATES

Deposited : October 23, 2001

For : AN IMPROVED ELECTRICAL SUBSTATION

New York, New York
October 23, 2001

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

Prior to calculation of the filing fee and before examination, kindly amend the above captioned application as follows:

IN THE CLAIMS:

Please cancel claims 1-14, without prejudice.

Please add new claims 15-28 as set forth on the enclosed pages.

IN THE ABSTRACT:

Delete the "Abstract"on the PCT cover sheet and replace it with the "Abstract of the Disclosure" set forth on a separate sheet attached hereto.

REMARKS

An abstract has been provided on a separate sheet; and the claims have been amended to conform to U.S. practice.

Wherefore, an early action on the merits is earnestly solicited.

Respectfully submitted,

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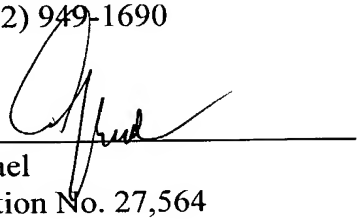

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PROPOSED NEW CLAIMS

15. A substation for use in a power transmission and distribution network, comprising:

a) a single phase isolating high frequency transformer having at least one input primary winding and at least one output secondary winding;

b) an input solid state high frequency switching network comprising a plurality of semiconductor switching devices, the input switching network defining at least one input node for receiving an input power waveform from the transmission network and at least one output node connected to the at least one primary winding of the transformer;

c) at least one output solid state high frequency switching network comprising a plurality of semiconductor switching devices, the output switching network being connected to the at least one secondary winding of the transformer and defining at least one output node from which an output power waveform is taken from the substation; and

d) control means for controlling the switching devices of the input and output switching networks to generate the output power waveform at the at least one output node from the input power waveform applied to the at least one input node.

16. The substation according to claim 15, in which the control means is operative for controlling the semiconductor switching devices in dependence upon current and/or voltage applied to the input switching network.

17. The substation according to claim 15, in which the control means is connected to receive power condition signals from measurement means located to sense

power flowing to the at least one input node, the control means being operative for outputting signals to the input and output solid state switching networks thereby to control switching of the semiconductor switching devices therein in response to variations to the power condition signals.

18. The substation according to claim 15, in which the input switching network comprises a bridge circuit having at least one input node for each phase of an input supply.

19. The substation according to claim 18, in which the control means is operative for controlling the semiconductor switching devices in the input switching network so that a single substantially sinusoidal waveform is generated in the at least one primary winding of the transformer, and for controlling the semiconductor switching devices in the output switching network to reconstruct output power waveforms of different phase from the output power waveform in the secondary winding of the transformer.

20. The substation according to claim 15, in which the control means is operative for controlling the semiconductor switching devices so as to produce at least one output voltage waveform which is independent of an input voltage waveform.

21. The substation according to claim 15, in which the semiconductor switching devices are arranged in relation to the transformer so that, in the event of a failure of at least one of the semiconductor switching devices and the transformer and the control means, then power is not transmitted across the transformer.

22. The substation according to claim 15, in which the control means is operative for controlling the semiconductor switching devices of at least the input switching network, in such a way as to match an input impedance of the substation to a source impedance of a supply line.

23. The substation according to claim 22, in which the control means is operative for modifying a switching state of at least one of the switching devices thereby to control the source impedance in real time.

24. The substation according to claim 15, and further comprising a limiting means for reducing a maximum output voltage produced in the event that a current drain exceeds a preset level.

25. A transmission and distribution network, comprising:

a) a transmission line for the transmission of electrical power from a generator;

b) a substation comprising:

i) a single phase isolating high frequency transformer having at least one input primary winding and at least one output secondary winding,

ii) an input solid state high frequency switching network comprising a plurality of semiconductor switching devices, the input switching network defining at least one input node for receiving an input power waveform from the transmission

network and at least one output node connected to the at least one primary winding of the transformer,

iii) at least one output solid state high frequency switching network comprising a plurality of semiconductor switching devices, the output switching network being connected to the at least one secondary winding of the transformer and defining at least one output node from which an output power waveform is taken from the substation,

iv) control means for controlling the switching devices of the input and output switching networks to generate the output power waveform at the at least one output node from the input power waveform applied to the at least one input node,

v) the substation being operatively connected to the transmission line; and

c) at least one distribution line connected to an output of the substation for onward supply of power to a load.

26. The network according to claim 25, in which the load comprises a second transmission line for transmitting alternating voltage from the generator, and in which the control means is operative for controlling the switching devices to generate the output power waveform for supply to a second network which is in phase with a phase of a voltage on the second network.

27. The network according to claim 25, in which the substation comprises two transformers and associated input and output switching networks connected in parallel between a supply line and the output load.

28. The network according to claim 25, in which a circuit breaker and a first isolator are provided upstream of the substation, and in which a second isolator is provided downstream of the substation.

PROPOSED NEW ABSTRACT

ABSTRACT OF THE DISCLOSURE

A substation is disclosed for use in a power transmission and distribution network. The substation comprises a single phase isolating high frequency transformer having at least one input winding and at least one output winding with corresponding input and output solid state switching networks. Each input solid state switching network comprises a plurality of semiconductor switching devices which receive an input waveform from the transmission network and output a high frequency waveform to the primary winding of the transformer. Likewise, each output solid state switching network comprises a plurality of semiconductor switching devices receiving a high frequency waveform from the secondary winding of the transformer and outputting an output frequency waveform from the substation. A control circuit is adapted to control the operation of the switching devices of the input and output switching networks to generate the output waveform from the input waveform.